Role of Information And Communication Technology (ICT) in System Development and Quality Delivery of Vocational Education in Nigeria: Curriculum Implications

Ugochukwu P.N. Amadi

Federal College of Education (Technical), Umunze-Anambra State, Nigeria

Abstract

The study investigated possibilities of integrating information and communication technology into Vocational Education for quality delivery of services. The various areas in which ICT can impact on Vocational Education were reviewed. Eight research questions were proposed to guide the study and sources of information for answering the questions included documented literature, experimental exploration and questionnaire. Fifty (50) secondary vocational teachers in the Anambra State school system responded to the questionnaire. Findings have a lot of implications which call for the ingenuity of both the teachers and students as well as collaborative indulgence of the schools and teachers as major state holders.

Keywords: *Information technology, vocational education, Nigeria*

Introduction

A system is characterized by mutual reinforcing and interacting processes and their resultant consequences (Haddad, 1970). Careful Planning is a Pre-requisite for the development of an efficient system which emphasizes self-regulation and self modification of such a system as it goes into operation. There is therefore the need to install a 'feedback' mechanism that would guarantee continuous self-modification. Anything short of this would be inimical to the set objectives of the system.

Developing a Vocational Education System with ICT as an integral part of the curriculum requires careful planning and systematic implementation since the change is innovative and man tends to resist change at least at the very point of its initiation.

Research Questions

The following questions guided the study
1. What steps are used in developing a system to ensure qualitative vocational education delivery?
2. What are the ICT competencies needed by students of vocational agricultural education?
3. How does ICT apply in Agricultural Education delivery system?
4. What ICT skills are needed by teachers for quality vocational education delivery?
5. What is the significance of ICT application in occupational practice for the realization of the objectives of secondary agriculture curriculum?

6. What are the possible consequences of integrating ICT into Secondary vocational curriculum?

7. What justification for an ICT- based vocational education delivery?

8. What are the curriculum implications for ICT integration into Secondary Vocational Education?

Developing a self-regulating and self-modifying vocational education system should involve the following mutually inclusive steps.

a. Evolution of Vision and Mission statements. What need statement, what people who at present are actively involved in new area programme of international area?

b. Definition of objectives of the system this is imperative since all other steps are aimed to build a system of learning to help learners to meet these objectives.

c. Identification, definition and clarification of possible limitation anticipate in the stated objectives.

d. Appraisal of alternatives brainstorming is useful here in suggesting potential solutions in an atmosphere of freedom and collaboration.

e. Selection of possible alternatives following possible objective assessment of proposed alternatives, and set standards of judgment, as each suggestion is weighed according to how well it meets the criteria.

f. Implementation of the selected alternatives are tried out over a considerable period of time.

g. Evaluation sequel to implementation trials, the system is evaluated to ascertain the degree of attainment of set objectives, vis-a-vis vision and mission statements. This is done with minimal subjectivity. How well did it go with the learners?

h. System Modification: the post implementation evaluation results will be used to effect modifications at the respective system components. At this stage, the first iteration is carefully studied to determine why and how objectives failed to be accomplished.

A pertinent question at this juncture therefore is 'what system operation is needed to ensure effective application of ICT in quality delivery of vocational education?"

ICT Concepts and Competencies in Contemporary Usages

ICT is a generic concept which refers to technologies by which various forms of information are collected, stored, and edited (SER, 1997). ICT can further be explained as multimedia application involving a combination of data carriers such as CD-Rom, video, floppy disk, internet and other software in which possibility for interactive communication is offered (Smeets, 1996). In the words of Nworgu. (2006) ICT is the acquisition, processing, storage, dissemination and use of vocal, pictorial, textual and numerical information by a micro electronic based combination of computing and telecommunication ICT therefore means an assemblage of all technologies by which information can be processed and communicated from one source (person) to the other using electronic devices.

What ICT Competencies are Needed by Students?

ICT Competencies refer to the knowledge, skills and attitudes that will enable learners to gain from ICT based instructive activities of curriculum or programme. They are competencies that focus on the process of learning and of course, teaching, enabling learners to use possibilities of ICT in a functional way so as to back and reinforce their own learning process. ICT competencies are special

knowledge skills and abilities bordering on cooperation/collaboration, independent learning, making differentiated exercises and exchanging information and project planning (www.ond.vlaandoren,be/dvo).

The competencies are inexhaustively outlined as follows:

- Competencies focusing on the learning process which enable learners to use the computer or multimedia in a skillful way (supportive or operating skill).
- The social and Ethical Competencies – which refer to the development of attitudes, to cope in a justified and responsible manner with the new technology with minimal nuisance value or self others.

The secondary vocational curriculum presently can accommodate these three competency levels that will enable the student/teachers to;

- Work together in a functional way on a straight forward assignment with ICT support;
- Develop student's capacity to use ideas and information;
- Be able to present information in multimedia with the aid of ICT;
- Develop student's ability to test ideas and evidence;
- Engage in independent learning;
- Facilitate personal development;
- Develop capacity of students to plan and manage their own learning:
- Disseminate knowledge;
- Facilitate Curriculum Based Evaluation (CBE);
- Engage in independent learning in an ICT supported learning environment;
- Retrieve, process and save information by mean of ICT;
- Communicate safely in a responsible and functional way via ICT;
- Practice learning content independently with ICT support; and
- Express own ideas in a creative way using ICT.

Application of ICT in Education Context

Available literature has revealed that ICT has successfully been applied in the following educational dimensions (Moonen & Kommers 1995, Pilot 1998 & SER, 1998):

1. Studying ICT education prepares students so as to use ICT in their, studies, future occupation and social life.
2. Use of ICT as a tool that aids in the collection of data and documentation, making arraignments, projects, conducting research and communicating. The entire world has been reduced to a global village and through on-line services student access virtual library resources from any pact of the world.
3. ICT used as an instructional medium provides tools for teaching and learn itself; a medium through instruction games and simulation, educational networks, drills and practice exercises, modeling etc.
4. ICT as a tool for the organization and management of educational environments. Nwogu (2006) noted such application areas to include: resources management and financial control, student personnel services, admission, processing and storage of academic records etc.

ICT Skills and Competencies Needed by Teachers for Quality Vocational Education Delivery

The advent of computer and its attendant technologies has been a source of worry to the uniformed mind who feels people would be through out of jobs. Teachers are not excluded from

this pathetic reservation. But the truth remains that an effective and creative teacher's job will enhance in quality service delivery upon ICT application. The instrumentality of the technologies of information and communication has significantly enriched the average teacher who can access the most current information bordering on content and pedagogy at the speed of light" Jagger and Lokman (1999) stated that for teachers to be ICT complaint, they need:

- a great pedagogical, didactical and educational psychology craftsmanship;
- subject matter mastery (in vocational content);
- a large knowledge (the application pssobilies of) modern educational tools; and
- skills in student guiding processes (such as formulating assignments, projects etc) and counseling.

Again considering the fact that the new teacher is forced to collaborate with other colleagues in a way entirely different from that he was used to be requires hands on experience and skills of:

Creativity, personal relations, flexibility, logistic (assigning work and study practices and student grouping skills for working in projects, collaborative or cooperative work communication, administration and organization.

The teacher should in fact be a good manager of both human and material resources and for these he needs a sound knowledge and skills of ICT.

Methodology/Instrumentation

The study adopted extensive review of literature and descriptive survey methods. A total of eight questions were raised to guide the study while size of the questions were theoretically answered via literature and experiential reviews, two were answered through questionnaire. The questionnaire was a 13-items instrument rated on a 4 point scale. Data was analyzed using frequencies, means and standard deviations. A total of fifty teachers of vocational subjects were used for the study. The area involved are Agricultural science, Home Economics, Business Studies, and Industrial Technical Education and Fine and Applied Arts. Ten (10) teachers were chosen from each subject area selected from secondary schools in three (3) Education Zones namely Awka, Aguata and Onitsha.

Results Presentation

Research Question 5: What is the significance of ICT application in occupational practice on the realization of the objectives of secondary vocational curriculum?

Table 1: *Mean Responses of Vocational Teachers on the Significance of ICT Application in Vocational Programme.*

S/NO	ITEM	RESPONSE		N = 50
1	Classroom instructions are no longer teacher centred.	3.56	.45	Accept
2	The new ICT emphasis has attracted variety of interest in educational development.	3.55	.30	Accept
3	The society must accept ICT without equivocation.	3.90	.25	Accept

4	With ICT teaching methods usually appear to be determinate and limiting to teacher's possibilities.	4.00	.23	Accept
5	Teachers presently are not sufficiently challenged and stimulated to create suitable learning environment using ICT.	3.89	.55	Accept
6	Schools and teachers need to learn how to design their own educational situation, employing ICT potentials	3.78	.45	Accept
7	Successful ICT application will change the teacher from transferring knowledge to guiding learning process.	3.42	.56	Accept

The result presented above indicate that ICT introduction the role of the teacher has been modified from that giver of knowledge" to that of guidance provider Teachers must learn to use ICT in instructional designs teaching and evaluation. This situation call for proper organization planning and order on the part of the schools.

Research Question 6: What are the possible consequences of ICT integration in secondary vocational curriculum?

***Table 2:** Mean Responses of Teacher on the consequences of ICT integration no secondary vocational curriculum.*

S/NO	ITEM	RESPONSE		N = 50
		X	SB	Decision
1	Teacher's role and task become more difficult and challenging	3.50	.36	Accept
2	The new learning environment presents the teacher with many uncertainties.	3.34	.29	Accept
3	Teacher is forced to collaborate with colleagues in an environment entirely different from that he is used to	3.77	.40	Accept
4	Teachers will be resentment to new change in process and methods of instruction delivery.	3.86	.55	Accept
5	Teachers and students need to be equipped with skills and competencies that will marked them ICT compliant.	3.38	.25	Accept
6	Retraining of teachers on current practices in imperative.	3.55	.46	Accept

The above results indicate that ICT integration into secondary vocational curriculum have some inevitable consequences which if properly managed will enhance quality delivery of

educational dividends. Since the teacher is an integral part of the school system, some environment (school) variables are bound to (1995) and Odenthal (1998) include among others the following:

- Technical prerequisites such as infrastructure
- Organizational prerequisites such vision and mission statement as well culture.
- Personnel support (involving knowledge, attitudes, skills and competencies)

Justification for ICT Based Vocational Education

The integration of ICT as a component of vocational curriculum is justified by its attendant benefits identified and yet to be identified.

1. Most institutions in the society are going to become more efficient in their junctions as a result of information technology (IT) application and at some point, the primary and secondary schools will, too. This fit is just too good to ignore. The PC like education, is devoted to information how to get it, how to organize it, how to evaluate it, how to use it, how to keep it at hand, how to disseminate it (Gates, 1996).

2. ICT makes Active Learning (AL) possible. AL is an instructional approach that combines four initial elements namely;
   i. Learning drawn from working on real problems;
   ii. Individuals retains responsibilities for their own problems;
   iii. It involves a group of learners who are engaged in real problems
   iv. In includes the attempt to implement (and thereby test the) ideas developed with the action learning set.

At is therefore an effective vehicle for developing creativity as it engenders a capacity to as productivity questions and creativity most often raise from asking questions from different mind as (Bourner & Floct, 2002).

ICT enhances the quality teaching and learning. By proper planning, we set out clear learning outcomes and suitable teaching methods to achieve them.

3. ICT guarantees wider access and readership to learnable materials ride the use of internet possibilities.

4. ICT guarantees large group workshops that is, the application and use which are used to provide people with practice and hands on experiences of using information and ideas delivered by other means.

5. Technological development- IT offers unparalleled opportunities for information dissemination at relatively low cost.

6. There would be more variety on the student's learning that there is at present where lecture and seminars dominate the teaching processes students will devote time to independent learning made possible by on-line facilities.

Curriculum Implications/Policy Imperatives

It is envisaged that a more meaningful integrative ICT based education will entail collaborative and collective approach involving teacher –trainer, training institutions, and trainees as co-agents of change. This is so because as Jager and Lokman (1999) maintain:He cannot expect young and just start ing teachers to act as change agents. They have to adjust to the situation (the typical school setting) they encounter and have to familiarize themselves with new concepts and applications.

Collaborative arrangement will assist serving teachers to be ICT complaint not necessary by coercion but through learning from each other. Teachers learn from their won networks (Kwakman,

1999 & Reinen, 1999). Again collaborative linkages established between teacher training institutions and secondary schools will go steps further to facilitate the education service networks.

The relevance of ICT in Vocational Education has been elucidated in this study. Equally, some issues critical to its effective integration were identified as a way of ensuring quality objectives of the innovation. It is therefore rife to outline the following implicit curriculum implications:

1. The Administrators of our education system need to be more committed to ICT policy implementation by the provision of requisite enablement.
2. The school authorities, teachers of vocational subjects and other stake holders should demonstrate honest commitment to the innovation devoid of mere lip service.
3. Regular seminars, workshop and tutorials can be adopted as a means of improving the ICT skills and competencies of Vocational teachers.
4. Time scheduling should accommodate extra "time outs"
5. The Programme of ICT should not be by and hoe arrangement or its implementation by "crash approach" but should be integral to the entire education delivery system.
6. Instructional Design Approach (IDA) should be adopted in integrating ICT) in the schools vocational programmes.
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12. Instructional Design Approach (IDA) should be adopted in integrating ICT in the schools vocational programmes.

Recommendations

Sequel to the expose made in this study, it is hereby recommended that ICT integration into vocational education programme should be by the use of instructional design (ID). ID is systematic approach to course development that ensures that specification using learning and instructional theory to ensure the quality of instructions.

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